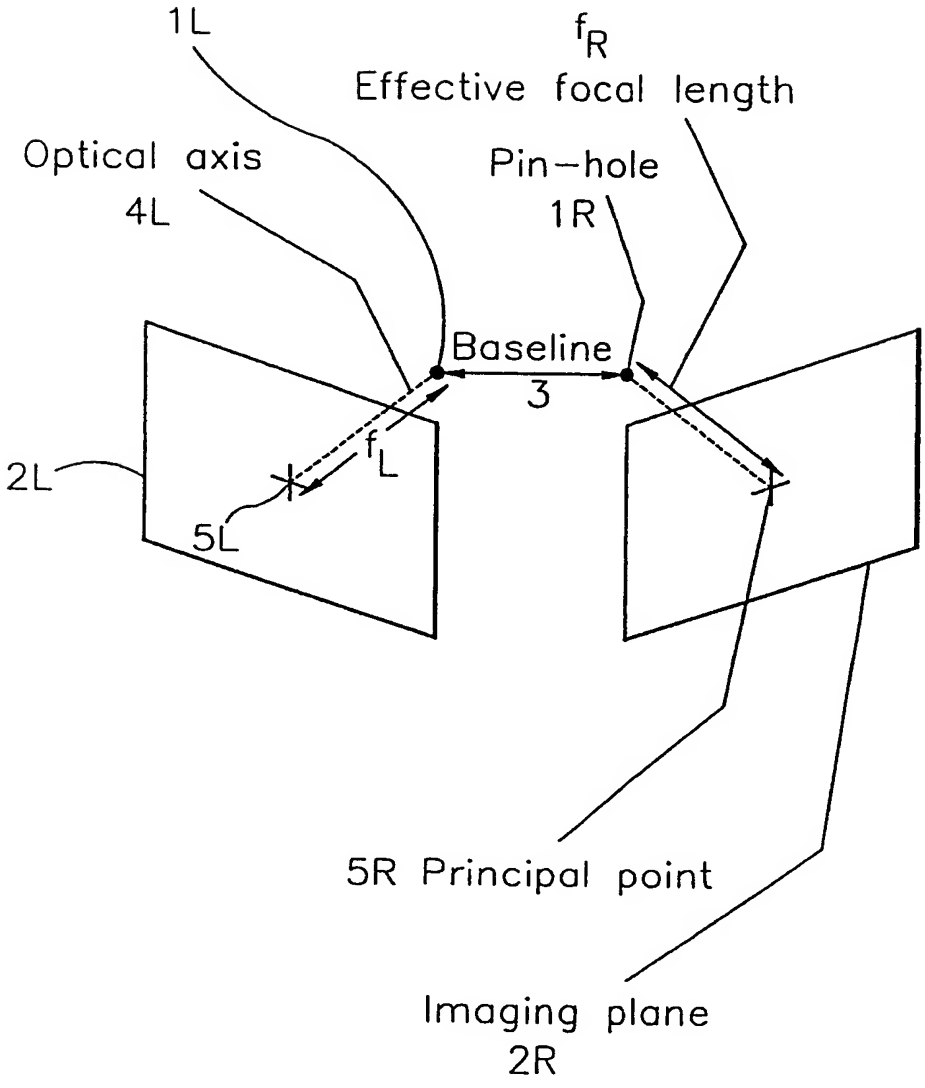

1L
f_R
Effective focal length
Optical axis
4L
Pin-hole
1R
Baseline
3
f_L
2L
5L
5R Principal point
Imaging plane
2R

FIG 1

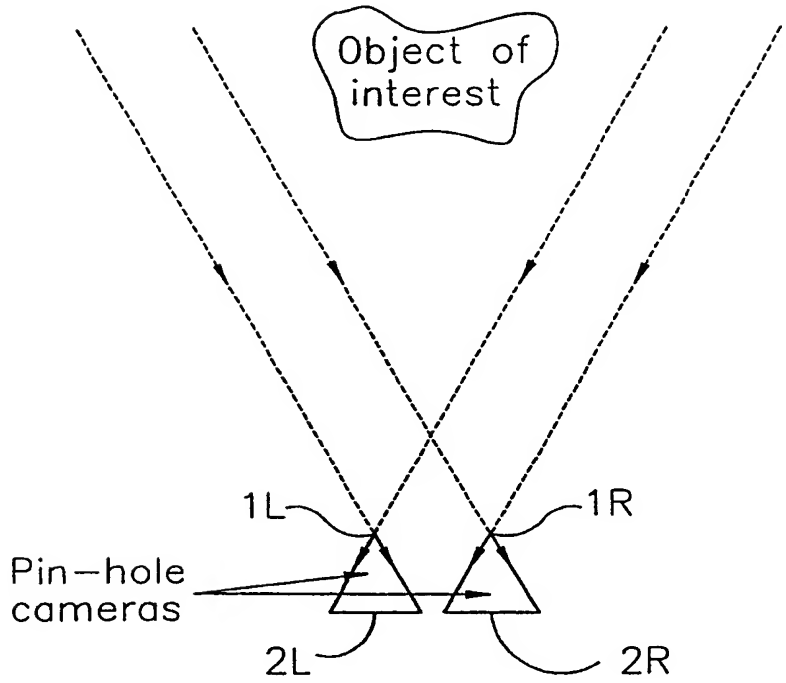
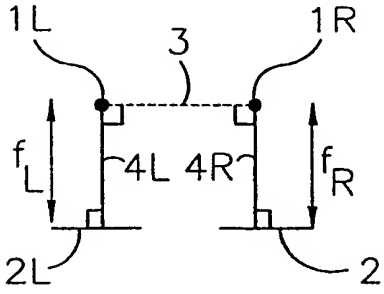


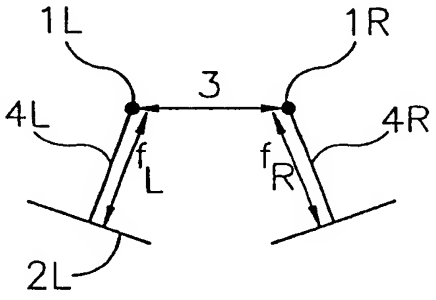
FIG 2 (a)



$f_L = f_R$

FIG 2 (b)

$f_L \neq f_R$



$f_L \neq f_R$

FIG 2 (c)

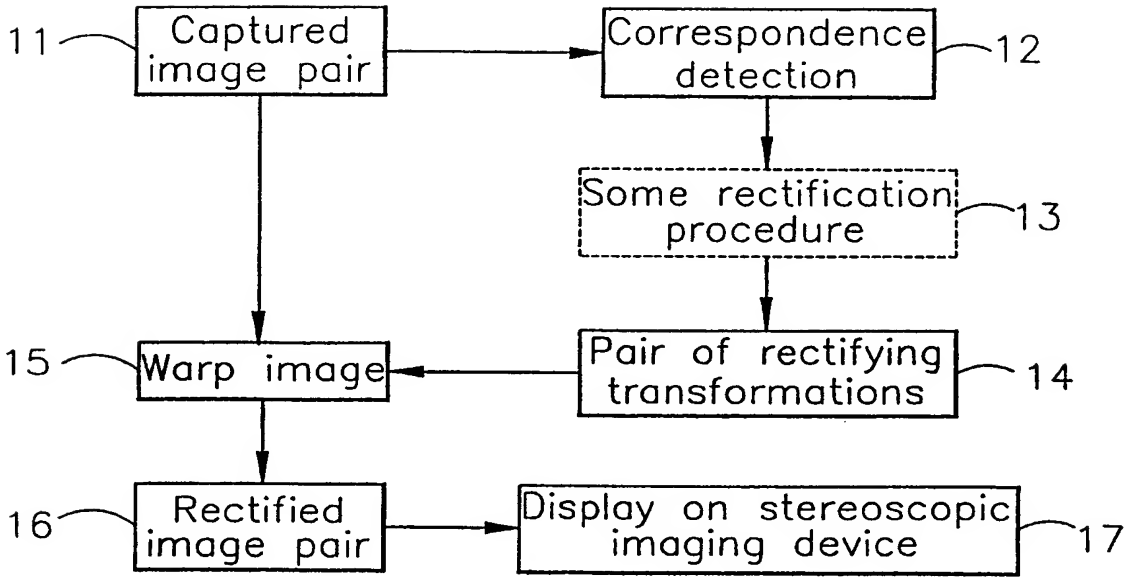

11
Captured image pair
Correspondence detection
12
Some rectification procedure
13
15
Warp image
Pair of rectifying transformations
14
16
Rectified image pair
Display on stereoscopic imaging device
17

FIG 3 (a)

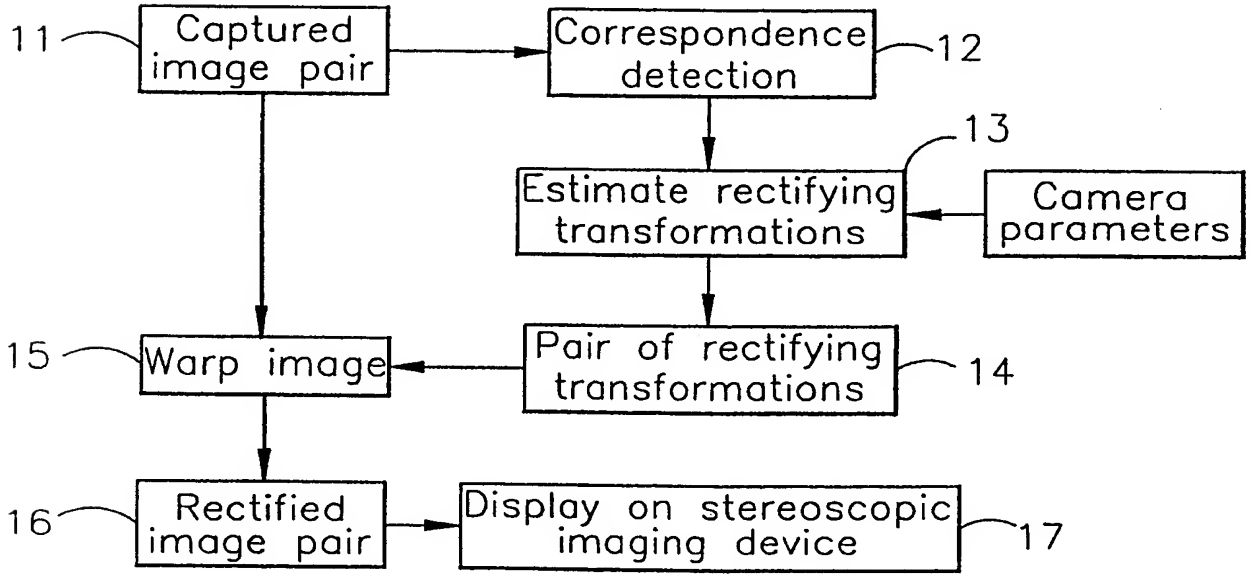

11
Captured image pair
Correspondence detection
12
13
Estimate rectifying transformations
Camera parameters
15
Warp image
Pair of rectifying transformations
14
16
Rectified image pair
Display on stereoscopic imaging device
17

FIG 3 (b)

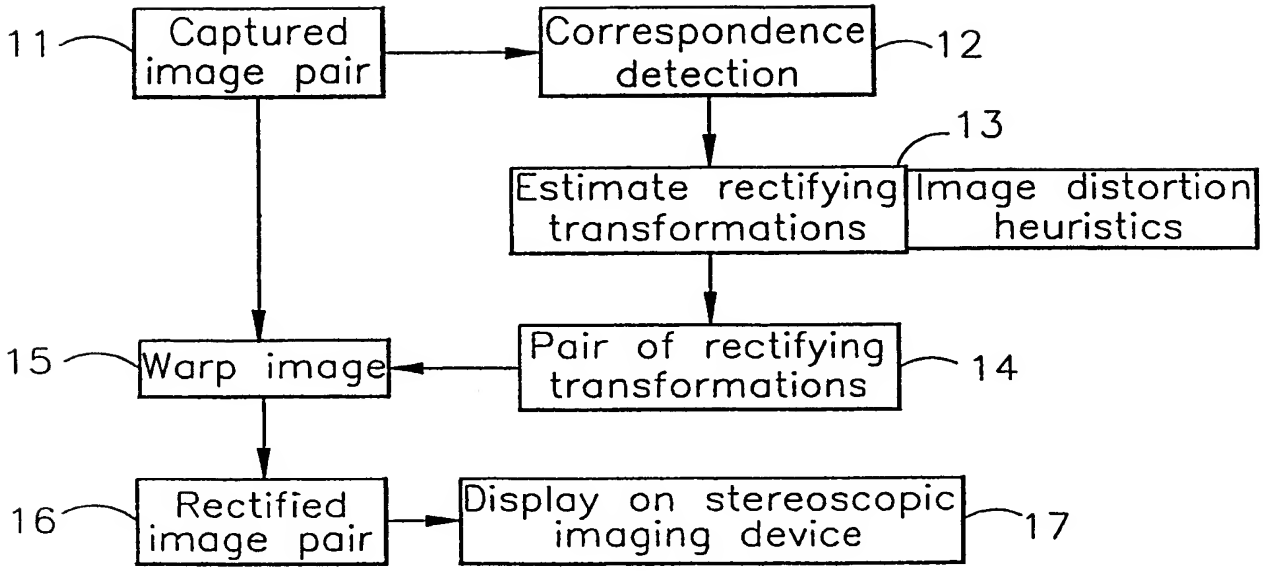

11
Captured image pair
Correspondence detection
12
13
Estimate rectifying transformations
Image distortion heuristics
15
Warp image
Pair of rectifying transformations
14
16
Rectified image pair
Display on stereoscopic imaging device
17

FIG 3 (c)

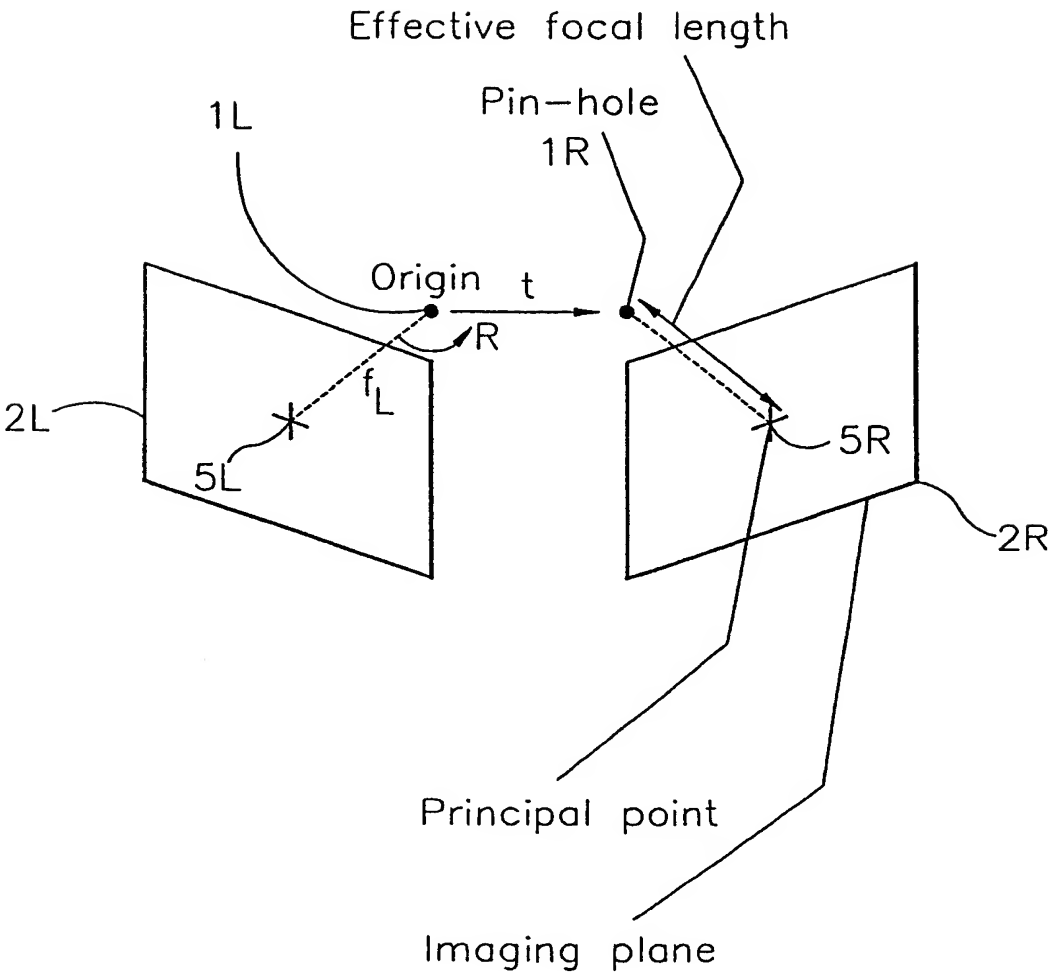

Effective focal length
Pin-hole
1L
1R
Origin
t
R
f_L
2L
5L
5R
2R
Principal point
Imaging plane

FIG 4(a)

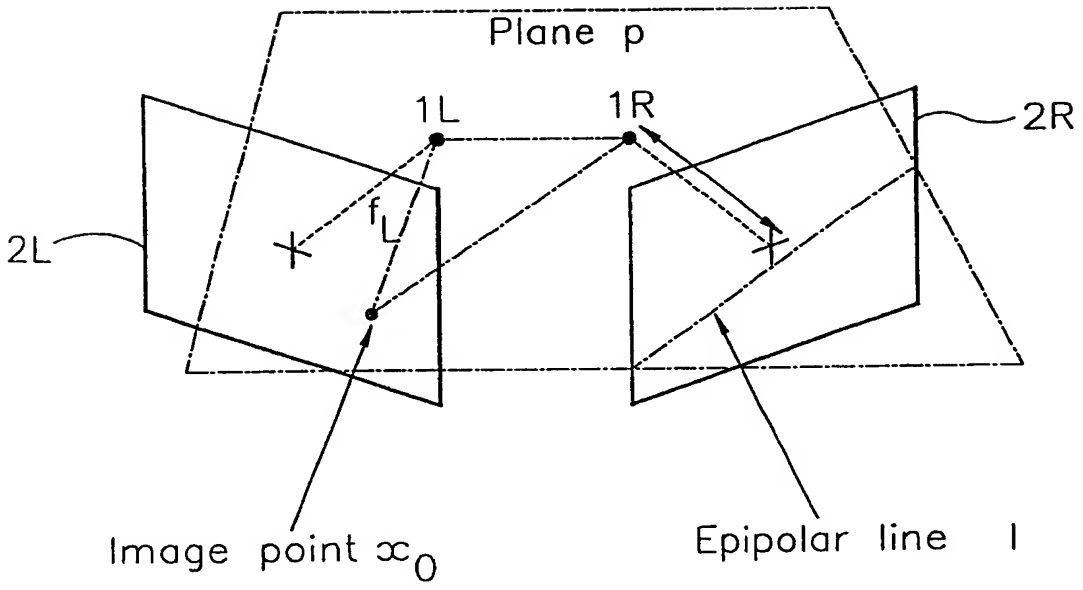


FIG 4(b)

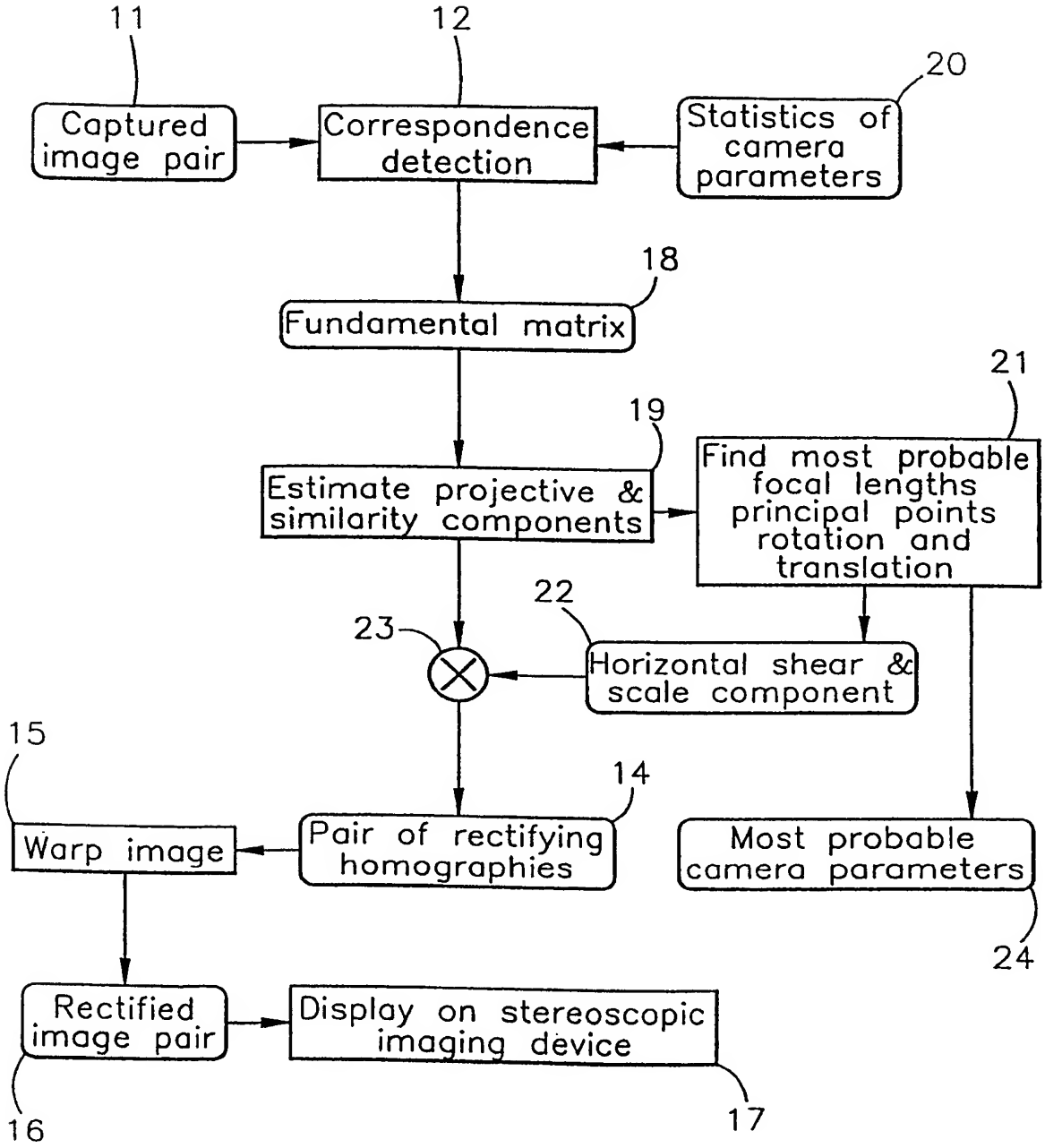

11
12
20
Captured image pair
Correspondence detection
Statistics of camera parameters
18
Fundamental matrix
21
19
Estimate projective & similarity components
Find most probable focal lengths principal points rotation and translation
22
23
Horizontal shear & scale component
15
14
Warp image
Pair of rectifying homographies
Most probable camera parameters
24
Rectified image pair
Display on stereoscopic imaging device
16
17

FIG 5

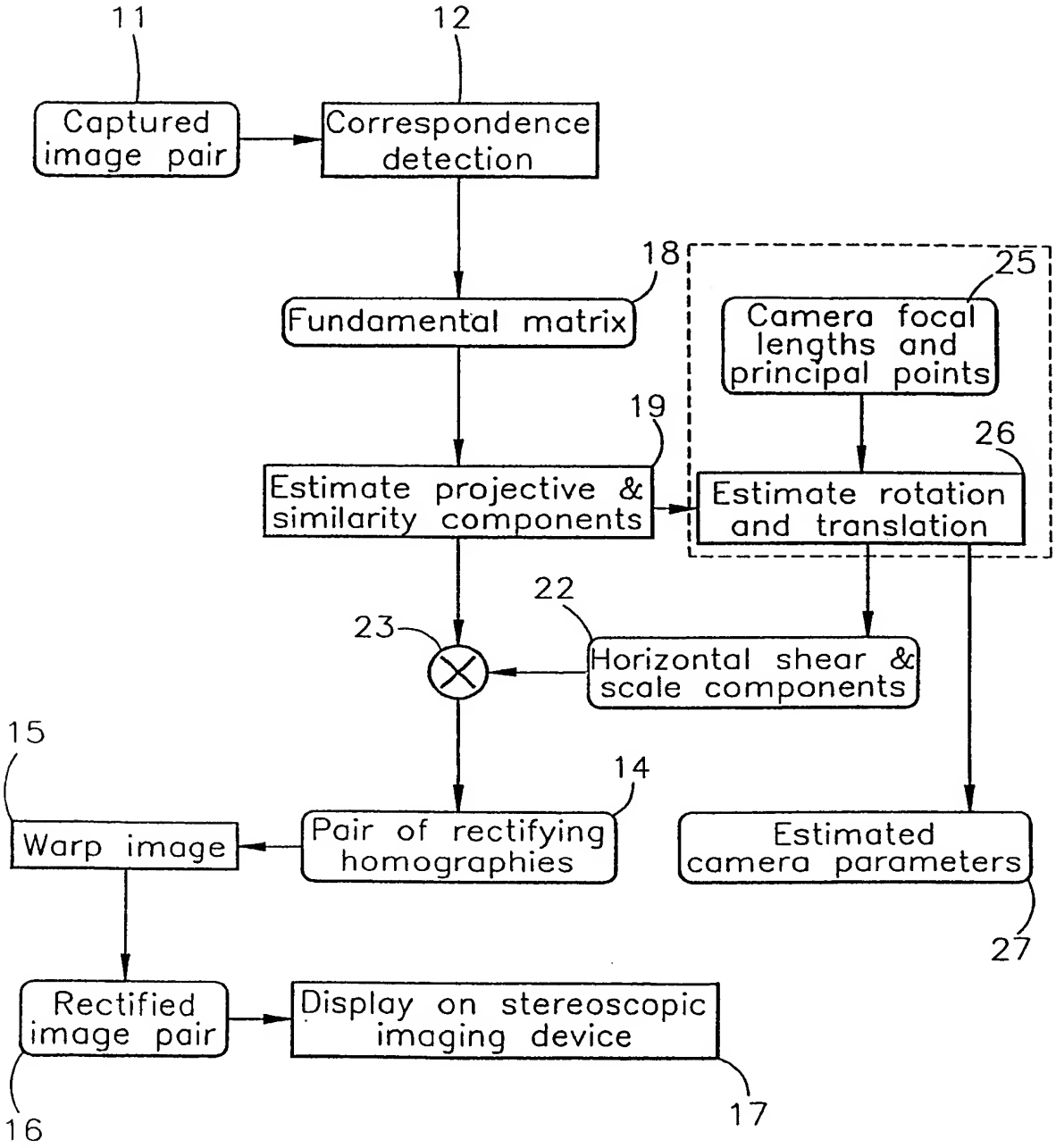

11
12
Captured image pair
Correspondence detection
18
Fundamental matrix
25
Camera focal lengths and principal points
19
26
Estimate projective & similarity components
Estimate rotation and translation
22
23
Horizontal shear & scale components
15
14
Warp image
Pair of rectifying homographies
Estimated camera parameters
27
Rectified image pair
Display on stereoscopic imaging device
16
17

FIG 6

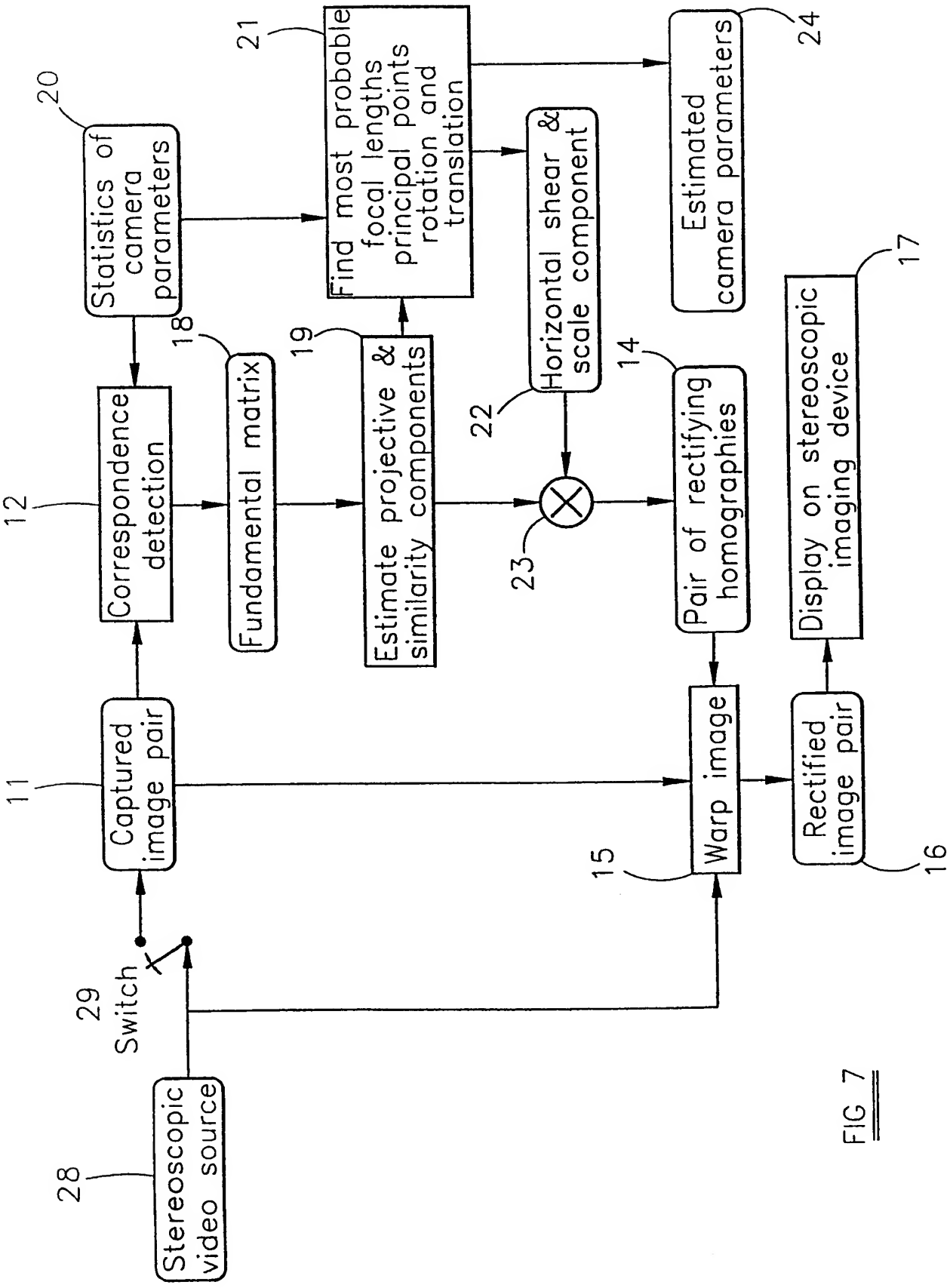

Stereoscopic video source
28
Switch
29
Captured image pair
11
Correspondence detection
12
Statistics of camera parameters
20
Fundamental matrix
18
Estimate projective & similarity components
19
Find most probable focal lengths principal points rotation and translation
21
Horizontal shear & scale component
22
23
Pair of rectifying homographies
14
Warp image
15
Rectified image pair
16
Display on stereoscopic imaging device
17
Estimated camera parameters
24

FIG 7

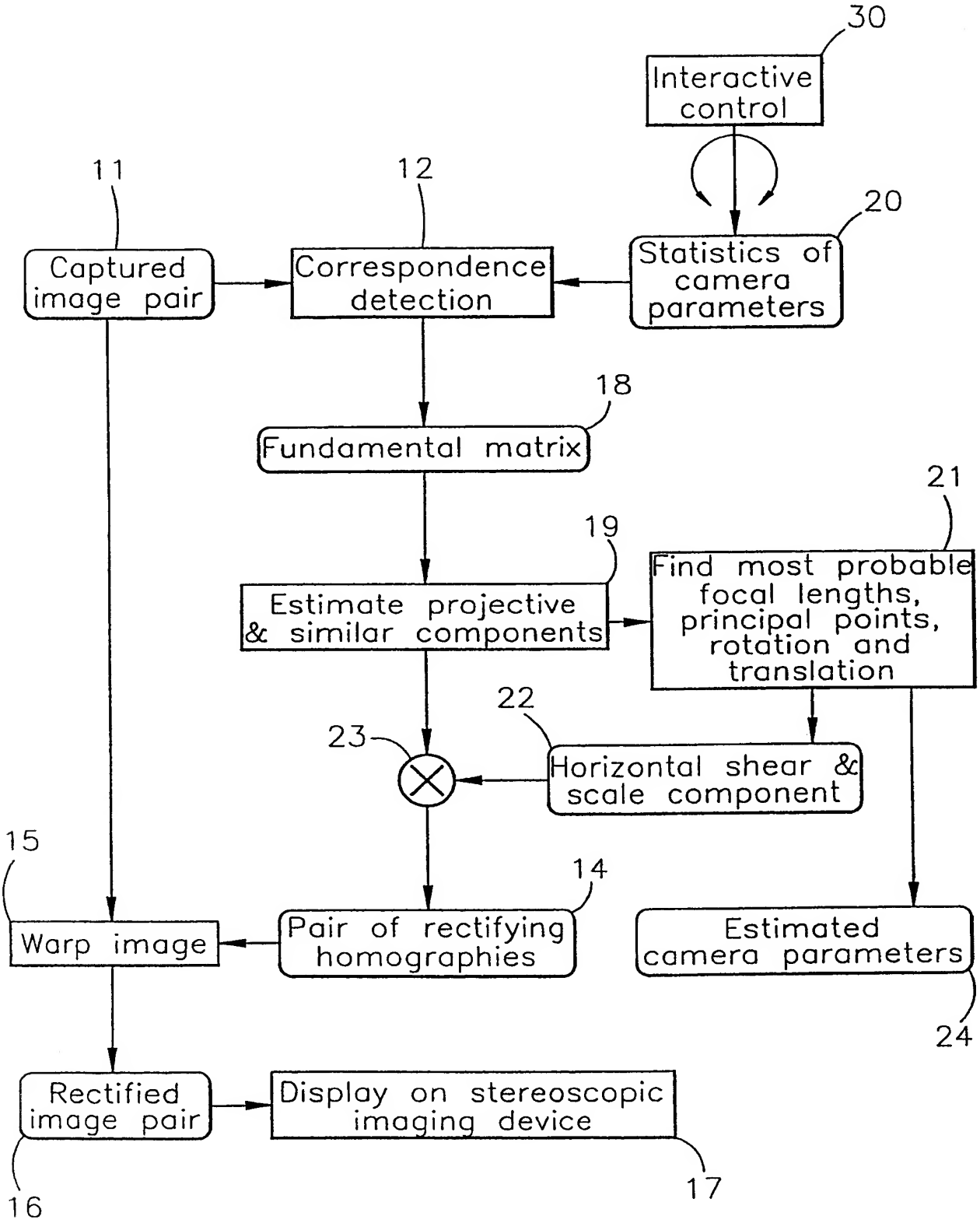

30
Interactive control
11
12
20
Captured image pair
Correspondence detection
Statistics of camera parameters
18
Fundamental matrix
21
19
Find most probable focal lengths, principal points, rotation and translation
Estimate projective & similar components
22
23
Horizontal shear & scale component
15
14
Warp image
Pair of rectifying homographies
Estimated camera parameters
24
Rectified image pair
Display on stereoscopic imaging device
16
17

FIG 8

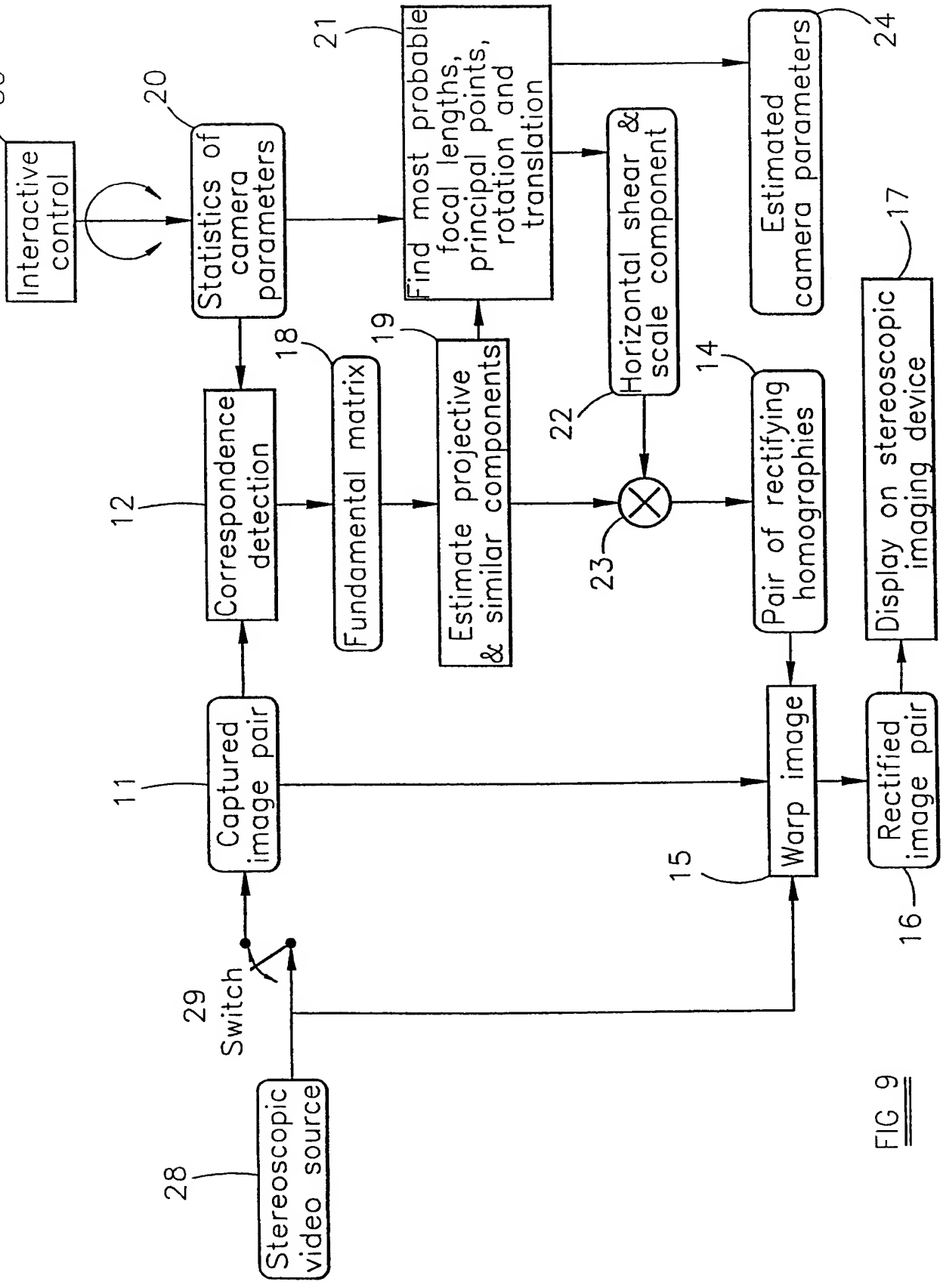

30
Interactive control
20
Statistics of camera parameters
21
Find most probable focal lengths, principal points, rotation and translation
24
Estimated camera parameters
Horizontal shear & scale component
22
18
Fundamental matrix
19
Estimate projective & similar components
12
Correspondence detection
14
Pair of rectifying homographies
23
17
Display on stereoscopic imaging device
11
Captured image pair
Warp image
15
Rectified image pair
16
29
Switch
28
Stereoscopic video source

FIG 9

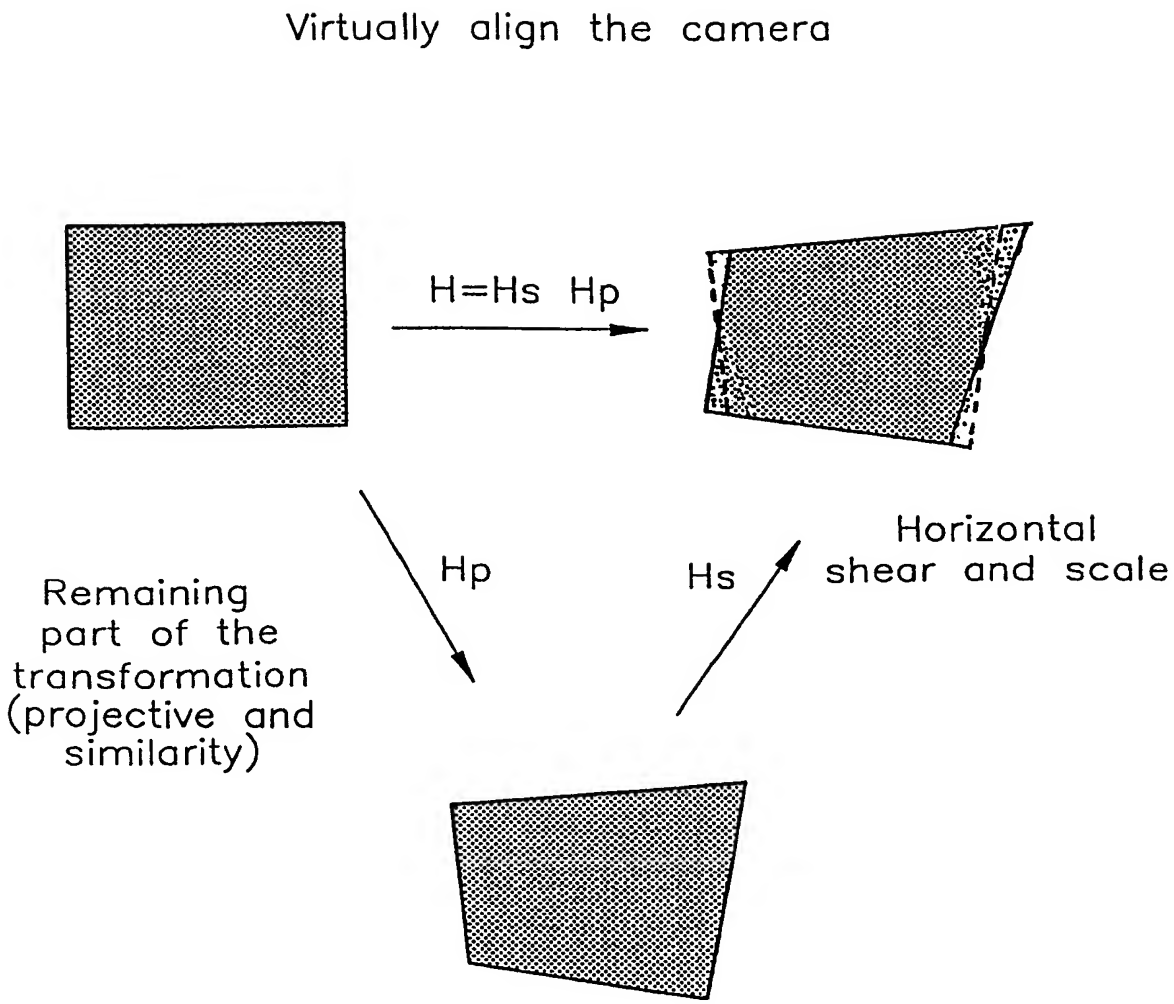

Virtually align the camera
H=Hs Hp
Hp
Hs
Horizontal
shear and scale
Remaining
part of the
transformation
(projective and
similarity)

FIG 10

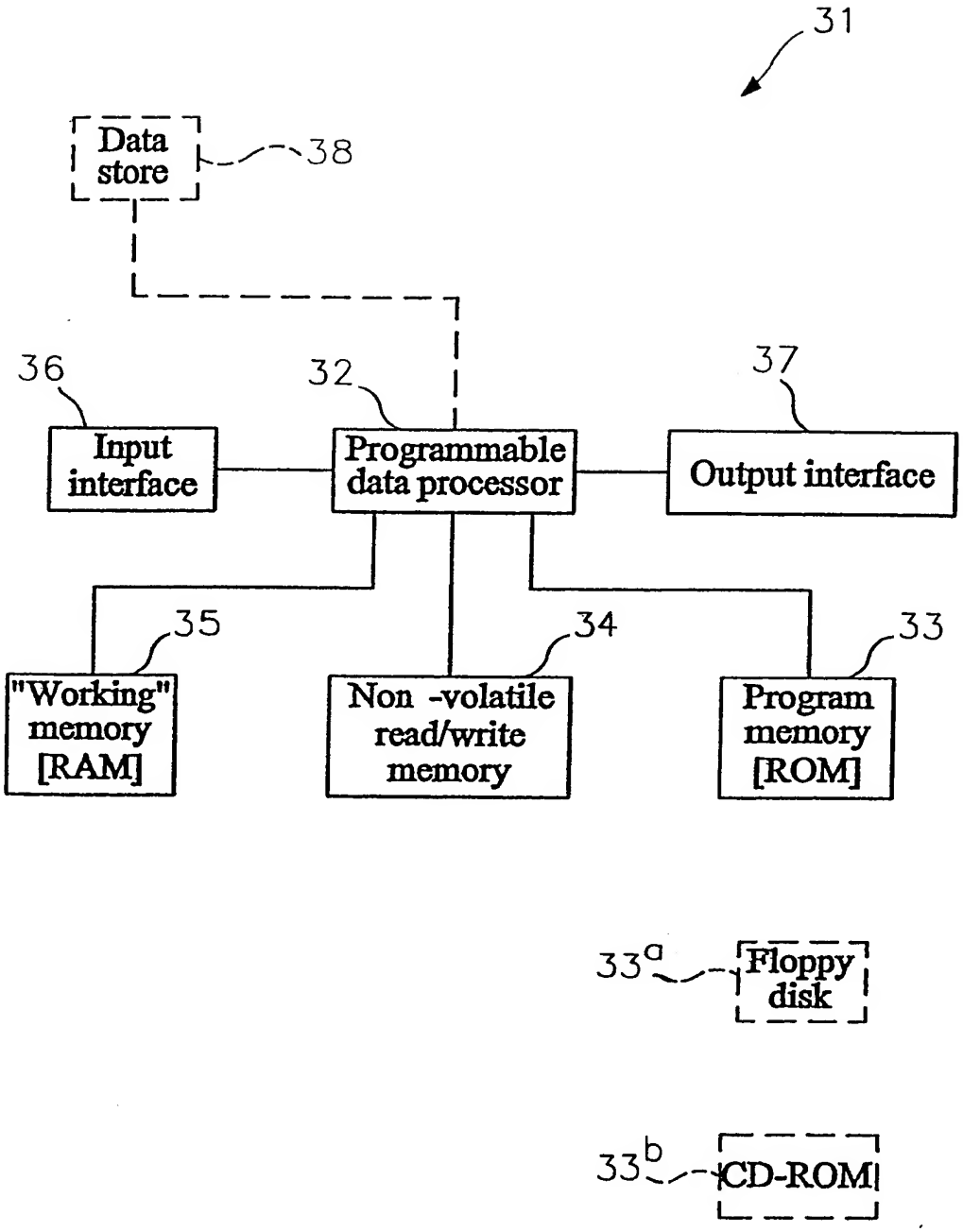

31
Data store
38
36
32
37
Input interface
Programmable data processor
Output interface
35
34
33
"Working" memory [RAM]
Non -volatile read/write memory
Program memory [ROM]
33a
Floppy disk
33b
CD-ROM

FIG 11